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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
YOHA, CONNIE C	

ART UNIT	PAPER NUMBER
2827	

DATE MAILED: 06/09/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

AK

Office Action Summary	Application No.	Applicant(s)	
	10/696,000	AMANO ET AL.	
	Examiner	Art Unit	
	Connie C. Yoha	2827	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *30 October 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-8 and 13-20* is/are rejected.

7)☒ Claim(s) *9-12* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *30 October 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Connie C. Yoha

CONNIE C. YOHA
PRIMARY EXAMINER

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *1/30/04 12/01/04*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. This office acknowledges receipt of the following items from the Applicant:

Papers submitted under 35 U.S.C. 119(a)-(d) have been placed of record in the file.

Information Disclosure Statement (IDS) filed on 12/1/04 and 1/30/04 were considered.

2. Claims 1-20 are presented for examination.

Claim Rejections - 35 USC э 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless --
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claim 1-2 and 13-20 are rejected under 35 U.S.C. 102(b) as being anticipated by Sin et al, Pat. No. 6803615.

With regard to claim 1, Sin discloses a magnetic memory comprising a plurality of memory cells, each memory cell including: at least one writing wire (fig. 3A, 44); at least one data storage portion (fig. 3A, 58), provided on at least one portion of an outer periphery of the writing wire, which comprises a ferromagnetic material whose magnetization direction can be inverted by causing a current to flow in the writing wire (col. 2, line 7-30); and at least one magneto-resistance effect element (fig. 3A, 42),

disposed in the vicinity of the data storage portion, which senses the magnetization direction of the data storage portion (col. 1, line 37-63).

With regard to claim 2, Sin discloses wherein each memory cell is provided with a writing selection transistor (fig. 2, 32) is connected at one of a source and a drain thereof to the writing wire (fig. 2, 28) (col. 2, line 44-54).

With regard to claim 13, Sin discloses a magnetic element comprising: a writing wire (fig. 3B, 44) and a magneto-resistance effect element (fig. 3B, 42), the magneto-resistance effect element including at least one magnetization free layer (fig. 8, 112) which covers an outer periphery of the writing wire and comprises a ferromagnetic material whose magnetization direction can be inverted by causing a current to flow in the writing wire (col. 6, line 17-25); and a stack film comprising a magnetization fixed layer (fig. 8, 108); a tunnel barrier layer (fig. 8, 110) sandwiched between the magnetization free layer (fig. 8,112) and the magnetization fixed layer (fig. 8, 108); and an anti-ferromagnetic layer provided on one said of the magnetization fixed layer opposite from the tunnel barrier layer (col. 6, line 29-33) (also with regard to claim 17).

With regard to claim 14, Sin discloses wherein the magnetization fixed layer (fig. 3B, 62) is provided with a first ferromagnetic layer (fig. 3B, 62a), a second ferromagnetic layer (fig. 3B, 62b), and a non-magnetic layer (fig. 3B, 64) sandwiched between the first ferromagnetic layer and the second ferromagnetic layer (also with regard to claim 18).

With regard to claim 15, Sin discloses a magnetic element comprising: a writing wire (fig. 3B, 44) and a magneto-resistance effect element (fig. 4B, 42), the magneto-

resistance effect element including at least one magnetization free layer (fig. 3B, 48') which covers an outer periphery of the writing wire (fig. 3B, 44) and comprises a ferromagnetic material whose magnetization direction can be inverted by causing a current to flowing the writing wire (col. 2, line 7-30); and a first (fig. 3B, 62a) and second (fig. 3B, 62b) stack films, the first stack film comprising a first magnetization fixed layer (fig. 3B, 62a) provided on one side of the writing wire via the magnetization free layer (fig. 3B, 48'); a first tunnel barrier layer (fig. 8, 110) provided between the magnetization free layer (fig. 8, 112) and the first magnetization fixed layer (fig. 8, 108); and a first anti-ferromagnetic layer provided on one said of the first magnetization fixed layer opposite from the first tunnel barrier layer (col. 6, line 26-31), the second stack film comprising a second magnetization fixed layer (fig. 3B, 62b) provided on the other side of the writing wire via the magnetization free layer; a second tunnel barrier layer provided between the magnetization free layer and the second magnetization fixed layer; and a second anti-ferromagnetic layer provided on one side of the second magnetization fixed layer opposite from the second tunnel barrier layer (col. 6, line 29-45) (also with regard to claim 19).

With regard to claim 16, Sin discloses wherein one of the first (fig. 3B, 62a) and second (fig. 3B, 62b) magnetization fixed layers is provided with a first ferromagnetic layer (fig. 3B, 62a), a second ferromagnetic layer (fig. 3B, 62b), and a non-magnetic layer (fig. 3B, 64) sandwiched between the first ferromagnetic layer and the second ferromagnetic layer (fig. 3B, 62a, 62b) (also with regard to claim 20).

Claim Rejections - 35 USC ∋ 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claim 3-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sin et al, Pat. No. 6803615 in view of Ooishi et al, Pat. No. 6757191.

With regard to claim 3, as applied in prior rejection, Sin discloses all claimed subject limitation including magnetic memory further comprise of the data storage portion (fig. 3A, 58) being provided at least one portion of an outer periphery of the cell bit line (fig. 3A, 44) the magneto-resistance effect element (fig. 3B, 42) being disposed in the vicinity of the data storage portion (fig. 3A, 58) and the cell bit line (fig. 3A, 44) functioning as the writing wire (fig. 3A, 44) (col. 5, line 7-15). Sin, does not disclose a plurality of common bit lines and cell bit lines, each of the cell bit lines being branched from each common bit line for each memory cell. However, Ooishi et al discloses an arrangement of a plurality of common bit lines (fig. 3, MBL) and cell bit lines (fig. 3, SBL) used to access the plurality of magnetic memory cells, each of the cell bit lines being branched from each common bit line for each memory cell (col. 8, line 57-67). Therefore, it would have been obvious for one having an ordinary skill in the art at the time the invention was made to incorporate the use of the sub bit line sharing the main

bit line to access and operated writing and reading of the magnetic memory cell array in Ooishi's into Sin's to reduce power consumption and reduce memory area space.

With regard to claim 4, Sin discloses wherein the data storage portion (fig. 3A, 58) is provided so as to surround at least three directions (fig. 3A, 58 covering side 50, 54, and 56) of four directions of the outer periphery of the writing wire (fig. 3A, 44), the magneto-resistance effect element is disposed in the remaining one direction (fig. 3A, 52) of the outer periphery, the magnetization direction of the data storage portion is substantially parallel to a circumferential direction of the writing wire, and the magnetization direction appearing at both ends of the data storage portion is sensed by the magneto-resistance effect element (col. 5, line 16-29).

With regard to claim 5, Sin discloses wherein the data storage portion (fig. 3B, 58') is provided so as to surround four directions (col. 5, line 40-42) of the outer periphery of the writing wire (fig. 4B, 44), the magneto-resistance effect element (fig. 3B, 42) is provided so as to correspond to one direction of the four directions (fig. 3B, 52), and the data storage portion (fig. 3B, 58') and a magnetization free layer (fig. 3B, 48') of the magneto-resistance effect element are magnetically coupled (also with regard to claim 6)..

With regard to claim 7, Sin discloses further a sense assist wire (fig. 3A, or 3B, element 26 or 46) which is provided in the vicinity of the magneto-resistance effect element (fig. 3B, 42) and generates a magnetic field due to a current flowing therein and which assists sensing of the magnetization direction of the data storage portion (col. 2, line 1-20) (also with regard to claim 8).

Allowable Subject Matter

5. Claim 9-12 are objected as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The prior art of record does not show the limitation of in combination with other features, the interconnection of the first, second and third wiring portion, where a third wiring portion which has one end connected to the other end of the second wiring portion and is provided substantially in parallel with the first wiring portion such that the third wiring portion and the first wiring portion sandwich the magneto-resistance effect element and wherein the magneto-resistance effect element is electrically connected to one of the first wiring portion and the third wiring portion, the data storage portion has a first storage portion provided on an outer peripheral portion of the first wiring portion and a second storage portion provided on an outer peripheral portion of the third wiring portion, and the magneto-resistance effect element is provided in the vicinity of the first storage portion and in the vicinity of the second storage portion.

Conclusion

6. The prior art made of record and not relied upon is considered pertinent to applicants' disclosure. Schwarzl (6510078) and Fullerton et al (6650513) disclose magnetic memory device.

7. When responding to the office action, Applicants= are advised to provide the examiner with the line numbers and page numbers in the application and/or references cited to assist the examiner to locate the appropriate paragraphs.

8. A shortened statutory period for response to this action is set to expire 3 (three) months and 0 (zero) day from the date of this letter. Failure to respond within the period for response will cause the application to become abandoned (see MPEP 710.02 (b)).

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to whose telephone number is (571) 272-1799. The examiner can normally be reached on Mon. - Fri. from 8:00 A.M. to 5:30 PM. The examiner's supervisor, David Nelms, can be reached at (571) 272-1787. The fax phone number for this Group is (703) 872-9306. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 305-0956.

10. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov should you

have questions on access to the Private Pair system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

C. Yoha

June 2005

CONNIE C. YOHA
PRIMARY EXAMINER